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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,503	03/11/2004	Yang Gao	0160113	8334

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FARJAMI & FARJAMI LLP
26522 LA ALAMEDA AVE.
SUITE 360
MISSION VIEJO, CA 92691

EXAMINER	
SERROU, ABDELALI	
ART UNIT	**PAPER NUMBER**
2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/799,503	GAO, YANG	
	Examiner	Art Unit	
	ABDELALI SERROU	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-12,14-22,24-28 and 30-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-12,14-22,24-28 and 30-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/5/11 has been entered.

Response to Amendment

2. In response to the office action mailed on 1/5/11, applicant filed an RCE on 5/5/11, amending claims 1, 12, 22, 28, 34, 37, 40, and 43. Claims 2, 13, 23, and 29 were previously cancelled. The pending claims are 1, 3-12, 14-22, 24-28, and 30-50.

Response to Arguments

3. Applicant's arguments with respect to the independent claims have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that the prior art reference Kroon does not teach the newly added limitation of " each of said plurality of voicing indexes is utilized for a high frequency region of said input speech signal during said coding said input speech signal by said encoder, wherein said high frequency region is defined as being above 5.0 kHz".

The examiner notes that the newly introduced prior art reference, Bessette (US 2005/0065785) teaches at the Abstract and paragraph [0002]) a method for encoding speech signal by indexing the pulse positions and amplitudes of non-zero-amplitude pulses in very large

algebraic codebooks needed for high-quality coding of wideband signals based on Algebraic Code Excited Linear Prediction (ACELP) techniques; and [0012] wherein said that in wideband speech/audio applications, the sound signal is sampled at 16000 samples/sec. At a rate of 1,6000 samples/sec, the voicing cut off frequency may take on values between 0 Hz (indicating a fully unvoiced signal) to 8000 Hz (indicating a fully voiced signal). 8000Hz is above 5 KHz.

As per the rest of the claims, and combinations of prior art reference, applicant has no further arguments beside the ones mentioned above. Therefore, all the combinations of prior art reference mentioned above are valid, and all other claims are rejected for the same reasons as set above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **1, 3-10, 12, 14-20, 22, 24-26, 28, 30-32, and 34-50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kroon (USPN 5,664,055) in view of Bessette (US 2005/0065785).

As per claim 1, Kroon teaches a method for improving synthesized speech quality in a speech coding system including an encoder and a decoder (Figs. 3, 4) comprising:

obtaining an input speech signal by an encoder (Fig. 3 correspond to the encoding part, wherein a speech signal is received by preprocessor 100);

coding said input speech signal by said encoder using a Code Excited Linear Prediction coder to generate coding parameters for synthesis of said input speech signal (Fig. 3, and corresponding cols. 4 and 5 , wherein a CELP encoder is encoding an input speech signal);

generating a plurality CELP speech frames by said encoder, each of said plurality CELP speech frames including CELP coding parameters (col. 6, lines 1-22, wherein the decoder receives transmitted CELP speech frames that include CELP coding parameters as in table 9);

creating a plurality of voicing indexes by said encoder wherein each of said plurality of voicing indexes relates to a characteristic of said input speech signal (cols. 7-10, wherein the decoder make use of all coded parameters and indexes, including voicing indexes, provided by the encoder. The encoder of Fig. 3 uses both Fixed Code Book (FCB) (unvoiced) and Adaptive Code Book (ACB) (voiced). Both, (FCB) and (ACB) got voicing indexes relating to a characteristic of said input speech signal); and

transmitting each of said plurality of voicing indexes as part of each of said plurality of CELP speech frames and in addition to said CELP coding parameters including line spectral frequencies, pitch, fixed codebook gain, adaptive codebook gain, and fixed codebook parameters (cols. 7-10, especially col. 9, lines 20-40, wherein the decoder extracts parameters indices from a received bit stream transmitted by the encoder. The parameters include line spectral frequencies, pitch, fixed codebook gain, adaptive codebook gain, and fixed codebook parameters), wherein each of said plurality of voicing indexes provides information from said encoder to said decoder for controlling one of an adaptive high pass filter, an adaptive perceptual weighting filter, an adaptive Sine window by said decoder, a spectrum tilt of said input speech signal by short-term enhancement of a fixed-codebook, a perceptual weighting filter, a linear prediction coder, a pitch

enhancement fixed-codebook and a post pitch enhancement (Kroon teaches measuring periodicity of a speech signal (col. 3, line 21-25) by a pitch -period processor (col. 5, lines 39-40) to generate an index M representing periodicity for each CELP frame. This is done at the encoder stage (col. 4, line 47). At the decoding stage (col. 6, line 1), the periodicity index submitted by the encoder is used yield a vector for application the fixed codebook gain amplifier and to generate the adaptive codebook contribution vector V (n) (col. 6, lines 23-55). These vectors and others are supplied to the postprocessor to control the post processing and harmonic filters of the synthesized speech signal (subsections II.4.2.1 – II.4.2.4, col. 27 –col. 29) such as a spectrum tilt of said input speech signal by short-term enhancement of a fixed-codebook control and adaptive gain and high pass filter control as in col. 29, line 7-67).

Kroon does not explicitly disclose wherein said each of said plurality of voicing indexes is utilized for a high frequency region of said input speech signal during said coding said input speech signal by said encoder, wherein said high frequency region is defined as being above 5.0 kHz.

Bessette in the same field of endeavor teaches at the Abstract and paragraph [0002]) a method for encoding speech signal by indexing the pulse positions and amplitudes of non-zero-amplitude pulses in very large algebraic codebooks needed for high-quality coding of wideband signals based on Algebraic Code Excited Linear Prediction (ACELP) techniques; and [0012] wherein said that in wideband speech/audio applications, the sound signal is limited to 50-7000 Hz and sampled at 16000 samples/sec. At a rate of 1,6000 samples/sec, the voicing cut off frequency may take on values between 0 Hz (indicating a fully unvoiced signal) to 8000 Hz (indicating a fully voiced signal). 8000Hz is above 5 KHz.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to use the high frequency voicing indexes, above 5 kHz, of the wideband frequency encoder of Bessette with the encoder of Kroon, in order to increase the intelligibility and naturalness of the speech signals ([0004]).

Regarding claim 12, Kroon teaches:

receiving a plurality of Code Excited Linear Prediction (CELP) speech frames by said decoder from said encoder (Figs. 3-4 and col. 4, lines 31-46);

obtaining a plurality of CELP coding parameters by decoding each of said plurality of CELP speech frames by said decoder (col. 4, line 31 –col. 6, line 55);

obtaining a plurality of voicing indexes in addition to said CELP coding parameters including line spectral frequencies, pitch, fixed codebook gain, adaptive codebook gain, and fixed codebook parameters by decoding each of said plurality of CELP speech frames by said decoder wherein each of said plurality of voicing indexes relates to a characteristic of said input speech signal (cols. 7-10, wherein the decoder extracts parameters indices from a received bit stream transmitted by the encoder. These parameters include line spectral frequencies, pitch, fixed codebook gain, adaptive codebook gain, and fixed codebook parameters (col. 9, lines 20-40). Also, the decoder makes use of all coded parameters and indexes, including voicing indexes, provided by the encoder. The encoder of Fig. 3 uses both Fixed Code Book (FCB) (unvoiced) and Adaptive Code Book (ACB) (voiced). Both, (FCB) and (ACB) got voicing indexes relating to a characteristic of said input speech signal); and

generating a synthesized version of said input speech signal using said plurality of CELP coding parameters and said plurality of voicing indexes by said decoder (column 1, lines 43-64

with column 4, line 49 - column 6, line 55).

Kroon does not explicitly disclose wherein said each of said plurality of voicing indexes is utilized for a high frequency region of said input speech signal during said coding said input speech signal by said encoder, wherein said high frequency region is defined as being above 5.0 kHz.

Bessette in the same field of endeavor teaches at the Abstract and paragraph [0002]) a method for encoding speech signal by indexing the pulse positions and amplitudes of non-zero-amplitude pulses in very large algebraic codebooks needed for high-quality coding of wideband signals based on Algebraic Code Excited Linear Prediction (ACELP) techniques; and [0012] wherein said that in wideband speech/audio applications, the sound signal is limited to 50-7000 Hz and sampled at 16000 samples/sec. At a rate of 1,6000 samples/sec, the voicing cut off frequency may take on values between 0 Hz (indicating a fully unvoiced signal) to 8000 Hz (indicating a fully voiced signal). 8000Hz is above 5 KHz.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to use the high frequency voicing indexes, above 5 kHz, of the wideband frequency encoder of Bessette with the encoder of Kroon, in order to increase the intelligibility and naturalness of the speech signals ([0004]).

Regarding **claims 3 and 14** , Kroon discloses a method and encoder wherein at least one of said plurality of voicing indexes provides information from said encoder to said decoder for controlling the adaptive high pass filter by said decoder (high pass filter; column 4, lines 49-64 and column 27, lines 49-67).

Regarding **claims 4 and 15**, Kroon discloses a method and encoder wherein at least one

of said plurality of voicing indexes provides information from said encoder to said decoder for controlling an adaptive perceptual weighting filter by said decoder (adaptive perceptual weighting filter; column 8, lines 39-54).

Regarding **claims 5 and 16**, Kroon discloses a method and encoder wherein at least one of said plurality of voicing indexes provides information from said encoder to said decoder for controlling an adaptive Sinc window by said decoder (Sinc; column 20, lines 4-15).

Regarding **claims 6 and 17**, Kroon discloses a method and encoder wherein said enhancing at least one of said plurality of voicing indexes provides information from said encoder to said decoder for controlling spectrum tilt (spectral envelope tilted; column 17, lines 29-35) of said input speech by short-term enhancement of a fixed-codebook by said decoder (short-term; column 8, lines 31-37).

Regarding **claim 7**, Kroon discloses a method and encoder wherein said enhancing said synthesis of at least one of said plurality of voicing indexes provides information from said encoder to said decoder for controlling a perceptual weighting filter by said decoder (column 4, lines 49 – column 5, line 8).

Regarding **claims 8 and 18**, Kroon discloses a method and encoder wherein said enhancing at least one of said plurality of voicing indexes provides information from said encoder to said decoder for controlling a linear prediction coder by said decoder (LP; column 4, lines 49-64).

Regarding **claims 9 and 19**, Kroon discloses a method and encoder wherein said enhancing said synthesis at least one of said plurality of voicing indexes provides information from said encoder to said decoder for controlling a pitch enhancement fixed-codebook by said

decoder (fixed codebook coupled to a pitch filter; abstract and column 27, lines 11-17).

Regarding **claims 10 and 20**, Kroon discloses a method and encoder wherein said enhancing said synthesis of at least one of said plurality of voicing indexes provides information from said encoder to said decoder for controlling post pitch enhancement by said decoder (post-filtering; column 27, lines 49-67).

Regarding **claims 34 and 37**, Kroon discloses a method and encoder wherein each of said plurality of voicing indexes has a plurality of bits indicative of a classification of each frame of said plurality of CELP speech frames (column 23, lines 31-59.

Regarding **claims 35 and 38**, Kroon discloses a method and encoder wherein said plurality of bits is three bits (3 bits; column 23, lines 29-33).

Regarding **claims 36 and 39**, Kroon discloses a method and encoder wherein said classification is indicative of periodicity of said input speech signal (periodicity classification; column 30, lines 1-65).

Regarding claims 22, (24, 30), (25, 31), (26, 33), 28, (40, 43), 41, and 44, respective system claims 1, (3,14), (4,15), (5,16), 12, (34,37), (35,38), (36,39) and method claims 22, (24, 30), (25, 31), (26, 33), 28, (40, 43), 41, and 44 are related as apparatus and the method of using same, with each claimed element's function corresponding to the claimed method step. Accordingly claims 22, (24, 30), (25, 31), (26, 33), 28, (40, 43), 41, and 44 are similarly rejected under the same rationale as applied above with respect to method claims 1, (3, 14), (4,15), (5,16), 12, (34,37), (35,38), (36,39).

Regarding **claims 45,** Kroon discloses a method and encoder wherein said periodic index ranges from a low periodic index to a high periodic index (column 30, lines 1-65).

As per **claim 46**, Kroon teaches wherein said plurality of voicing indexes is used in place of pitch gain for post pitch enhancement (Abstract).

As per **claim 47**, Kroon teaches wherein said plurality of voicing indexes are used to control a modification to a low pass filter for said Sinc window (col. 20, lines 4-15).

As per claims 48-49, Kroon teaches wherein each of said plurality of voicing indexes is derived from a normalized pitch correlation parameter Rp, where -1.0< Rp< 1.0,(col. 20, lines 4-15, wherein normalized pitch correlation vectors are used. As per the claimed range, the examiner notes that correlation is statistic representation of how closely two variables co-vary; it can vary from -1 (perfect negative correlation) through 0 (no correlation) to +1 (perfect positive correlation). Therefore, the claimed range is a standard range to be used).

Claims 11, 21, 27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kroon in view of Bessette, as applied to claims 1, 12, 22, and 28, and further in view of Morii et al. (PGPUB 2006/0206317).

Regarding **claims 11, 21**, Kroon in view of Bessette disclose a method of improving synthesized speech quality, but do not explicitly disclose a method and encoder wherein at least one of said plurality of voicing indexes is for use by said decoder to select at least one sub-codebook from a plurality of sub-codebooks.

Morii discloses a method and encoder wherein at least one of said plurality of voicing indexes is for use by said decoder to select at least one sub-codebook from a plurality of sub-codebooks (sub-codebooks, paragraphs [109]-[110] with paragraphs [49]-[56]), to achieve an excellent sound quality at the time of decoding.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined system of Kroon and Bessette and encoder as described above, to correspond to input signals with carious characteristics and achieve excellent sound qualities at the time of decoding (abstract).

Regarding claims 27 and 33, system claims 11 and 21 and method claims 27 and 33 are related as apparatus and the method of using same, with each claimed element's function corresponding to the claimed method step. Accordingly claims 27 and 33 are similarly rejected under the same rationale as applied above with respect to method claims 11 and 21.

Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kroon in view of Bessette, as applied to claim 1, and further in view of Kandhadai et al. (US 20030028373 published Feb. 6, 2003).

Kroon in view of Bessette teaches all the limitations of claim 1, upon which claim 50 depends. Kroon in view of Bessette does not explicitly disclose wherein at least one of said plurality of voicing indexes provides information from said encoder to said decoder for bi-directional pitch enhancement.

Kandhadai in the same field of endeavor teaches using bi-directional pitch enhancement (forward and backward pitch enhancement, Abstract, and [0046]]). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to use the bi-directional pitch enhancement of Kandhadai with the system of Kroon in view of Bessette, in order to improve the perceptual quality of output speech by obtaining pitch continuity between frames.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDELALI SERROU whose telephone number is (571)272-7638. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James S. Wozniak can be reached on 571-272-7632. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Abdelali Serrou/
Examiner, Art Unit 2626

/ QI HAN/

Primary Examiner, Art Unit 2626